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This document describes the first part of a more comprehensive study which will be continuing throughout the 1968-1969 academic year. The general purpose of this study is to develop a preliminary model for the management of a work-oriented vocational system. This model outlines the components of a system which, if established, would provide a structure for decision-making in the management of work-oriented education. This report discusses the following topics: (1) the existing system of vocational education and technical education, (2) a description of a model work-oriented educational system including specification of objectives and discussion of factors related to the objectives, (3) an objective analysis of alternative administrative units for a work-oriented education, (4) recommendations for the implementation of objectives, (5) recommendations for further research. Components of the model system of the work-oriented education include students, instructional staff, management-administration, curriculum, supportive services, facilities, and equipment. These components were studied and this report presents a description of the elements of each component. (CH)

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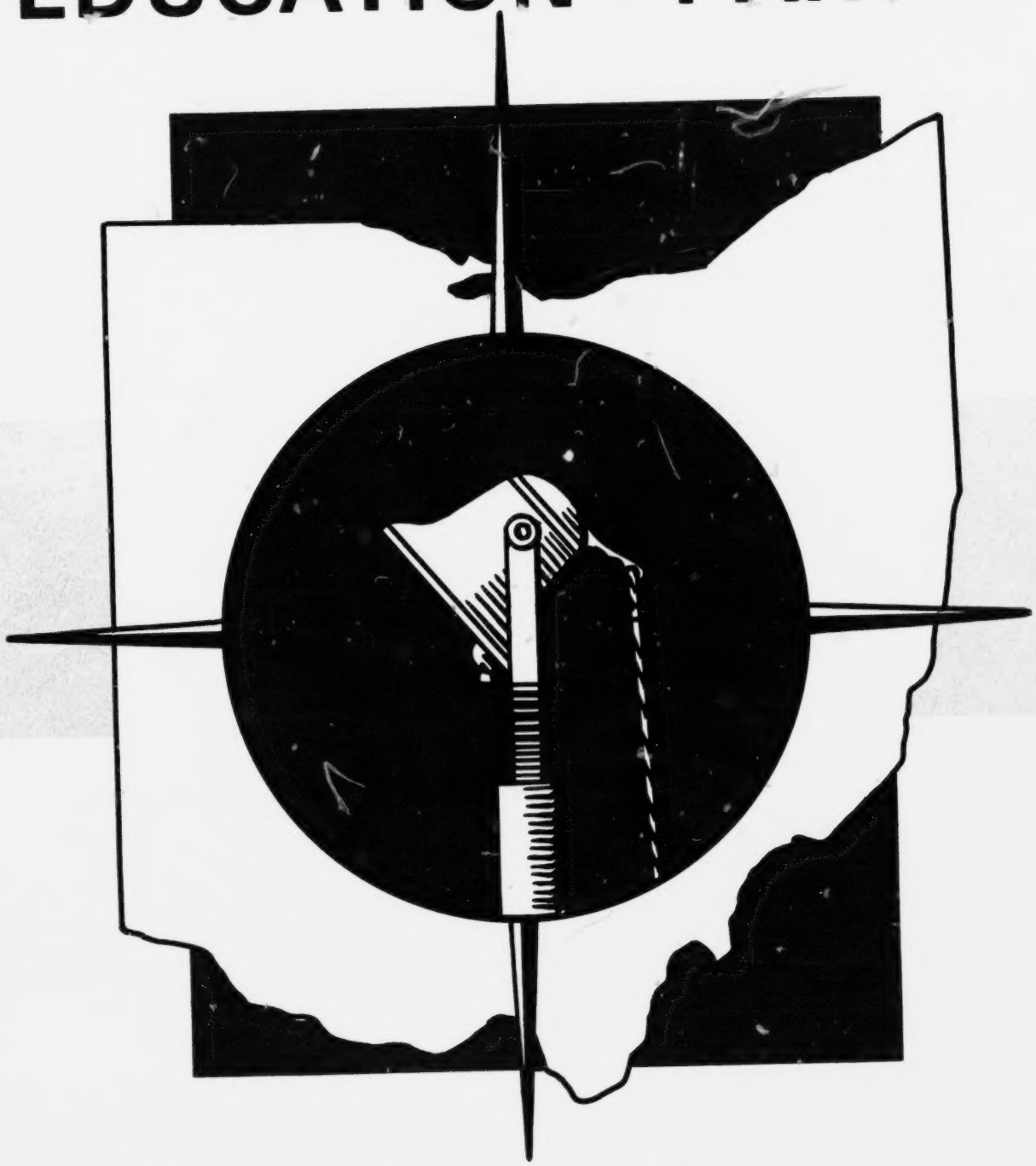
# VOCATIONAL AND TECHNICAL EDUCATION—PART I



PREPARED FOR THE

## OHIO DEPARTMENT OF EDUCATION

BY

BATTELLE MEMORIAL INSTITUTE
COLUMBUS LABORATORIES

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# CONDENSED TASK REPORT

on

# VOCATIONAL EDUCATION AND TECHNICAL TRAINING

## Part I

to

## OHIO DEPARTMENT OF EDUCATION

November, 1968

by

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# FOREWORD

This report is the result of editing and reducing one of a series of Task Reports prepared by the staff of Battelle Memorial Institute, Columbus Laboratories, for the Ohio Department of Education under a contract research project entitled PLANNING TO MEET EDUCATIONAL NEEDS IN OHIO SCHOOLS. Funds for the project were made available under a Title III, ESEA grant from the U.S. Office of Education to the Ohio Department of Education.

This condensed version of a Battelle Task Report was prepared to present the essentials of Battelle's findings as briefly as possible without loss of content or continuity in order to facilitate dissemination of the research findings to a wider audience.

Battelle has assessed educational needs in vocational education and technical training, school facilities, paraprofessionals and supportive assistants, data processing, educational technology, library services, and pupil transportation, each of these being the subject of a research Task.

Eight reports were prepared by Battelle as a result of these studies: seven Task Reports and one Summary Report. The Task Reports represent research studies aimed at the seven subjects mentioned above. The recommendations and conclusions stated in the Task Reports do not reflect full consideration of the educational system as a whole. The Summary Report considers the Task Reports collectively and seeks to relate the results of the Task studies to the educational system as a whole.

The reader is thereby offered two views, one of a specialized nature through a Task Report and one of an integrative nature through the Summary Report. The two views will have much in common, but will occasionally reflect differences arising out of the different context in which the studies were viewed. Accordingly, the reader may wish to study both the Summary Report and the related Task Report on a given subject.

This report is a Condensed Task Report. It carries the essential impact of the Task Report from which it was taken.

Dissemination of the material contained herein is the responsibility of the Ohio Department of Education. Requests for copies with designation of the report(s) desired, may be directed to Dr. Russell A. Working, Division of Research, Planning and Development, 71 East State Street, Room 205, Columbus, Ohio 43215.

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# VOCATIONAL EDUCATION AND TECHNICAL TRAINING

## PART I

## INTRODUCTION

This document describes the first part of a more comprehensive study which will be continuing throughout the 1968-1969 academic year. The final report will examine many of the questions raised in this report about the effectiveness and relevance of existing vocational and technical education programs, as well as suggestions for improvement. In addition, the concept of work-oriented education presented in this report will be studied in greater detail in the second report with recommendations for implementation in Ohio schools.

### Purpose of the Study

The general purpose of this study was to develop a preliminary model for the management of a work-oriented educational system. This model outlines the components of a system which, if established, would provide a structure for decision-making in the management of work-oriented education.

### Method of Attack

The procedure for carrying out this study includes these steps:

(1) Analyze the existing data on performance in vocational and technical education

(2) Consider the need, if any, for a new approach to education for work

(3) Review alternative educational systems which would emphasize a broad occupational experience for all

(4) Specify the objectives of the proposed educational system

(5) Define the components of the proposed educational system

(6) Propose tentative objectives for selected components of the system

(7) Recommend further research

(8) Develop some immediate, intermediate, and long-range solutions to problems identified in this study.

## Overview

This report is presented in the following format:

(1) A discussion of the existing system of vocational education and technical education

(2) The description of a model work-oriented educational system including specification of objectives and discussion of factors related to the objectives

(3) An objective analysis of alternative administrative units for work-oriented education

(4) Recommendations for the implementation of objectives

(5) Recommendations for further research.

# THE EXISTING SYSTEM

## Education in America

There is a growing awareness of the social problems of contemporary life and of the possibilities for more and better education in both remedial and preventive roles. As a result of this interest, there has been, since 1963, a considerable amount of activity to expand the number of programs and to increase the total enrollment in vocational and technical education. To avoid the possibility of inappropriate decisions and serious errors of judgment, planning for change is necessary; this planning must be accomplished within the traditional framework associated with the purposes of education in a democracy. Using the systems approach, it is necessary to begin with the objectives or goals of American society and the various components with their objectives in order to study vocational and technical education as a system.

The President's Commission on National Goals compiled a set of fifteen goals for America which outlined certain constitutional guarantees: (1) the rights of the individual must be guarded, (2) each individual's development must be ensured, and (3) each individual's opportunity must be enlarged. Planning for education, and particularly when it includes training for work, must be compatible with these goals.

Education has rarely made its objectives or goals operational; the results: objectives which are extremely difficult to implement or evaluate. Unless a system can specify what it is trying to accomplish, in terms that can be measured, it is almost impossible to assess the performance of that system. This is one reason why there are many problems in expanding and increasing the vocational and technical education system. As most individuals spend their adult life working, one of the most important functions of education is to prepare people for successful work experience. Successful work experience must be the ultimate goal of any type of education for work. Unless

students, parents, and the community really believe in the effectiveness of education, then all efforts to improve the system are of little consequence and little will be achieved.

Particularly, now that youth are more sensitive to the broad range of decisions to be encountered in adult life, education must make dynamic efforts to prepare each student for a changing and complex world. Instruction must be designed to produce flexible behavior patterns; this preparation must ensure, for each, a productive and rewarding life of work and leisure.

The type of education which is needed must be structured within the immediate and future social system in America; this education must be attuned to the last third of the twentieth century. The mobility and technology found in an urban and industrial economy require a more flexible educational program than a rural and agricultural economy does. Preparation for work on the farm usually implied that one would be living and working in the local community; today, the community has become regional, and agricultural occupational training now includes horticulture, chemical technology, and many other nonfarm occupations. But, the decreasing number of farm workers combined with an increasing demand for technical and service personnel in business and industry has shown the need for education to provide mechanisms which would smooth transitions to immediate employment, offer through training a broad range of promotion possibilities within and between companies, and build in the willingness to respond to the geographic mobility and personal flexibility needed for success. The challenge, then, is to prepare the individual for work, to design this preparation so that the range of personal choices is enlarged, and to provide for realistic choices based on abilities, interests, and opportunities.

## Organization of the Existing System

The most comprehensive and representative programs to provide job training in Ohio are administered by the Division of Vocational Education (DOVE) in the Ohio Department of Education (ODE), providing a wide range of services and a highly organized system to carry out programs in various areas of education for work. Most education for gainful employment is found in local school districts and in a few joint vocational school districts which provide training to eligible students from member districts. Education for work can be divided into three major categories: (1) vocational education, generally grades 11 and 12, for skilled and semiskilled occupations; (2) technical education, grades 13 and 14, post-secondary schools; and (3) adult vocational training, instruction for adults or out-of-school youth over 16.

## Objectives of the Existing System

From an examination of published materials on vocational and technical education, objectives were indicated for each category.

(1) Vocational education: to equip individuals for useful employment.

(2) Technical education: to prepare students for a cluster of job opportunities; or to prepare paraprofessional people in 2-year post-high school programs to support the professional people.

(3) Adult vocational education: to upgrade, update, or retrain persons, usually on a part-time basis, in response to changing manpower needs.

The American Vocational Association (1968) uses the Federal Government's PL 88-210 as a guide: "vocational and technical training or retraining is designed to fit individuals for gainful employment as semiskilled or skilled workers or technicians in recognized occupations..."

## Enrollment in the Existing System

Statistics released by the Ohio Department of Education point out that of 100 students who enter the first grade, only 76 finish high school, 32 start college, and 14 graduate from college. Other data, collected in 1966, show that only 11.1 percent of all Ohio students in grades 9-12 were enrolled in vocational programs, although many of this 11.1 percent were in the eleventh and twelfth grades. Looking closer at the data, we find that 24 percent of the people who enter school do not finish high school.

For a representative sample of 100 students who enter first grade, we see that:

24 do not finish high school

27 finish high school without preparation for work and do not go to college

18 start college but do not finish

17 graduate from high school with vocational education

14 graduate from college

From this breakdown, we may conclude that approximately 31 of the students are prepared for employment upon leaving either high school or college. This leaves 69 who are an untrained work force. The diagram on the following page shows the flow of people from elementary school into the labor force.

## Tentative Conclusions*

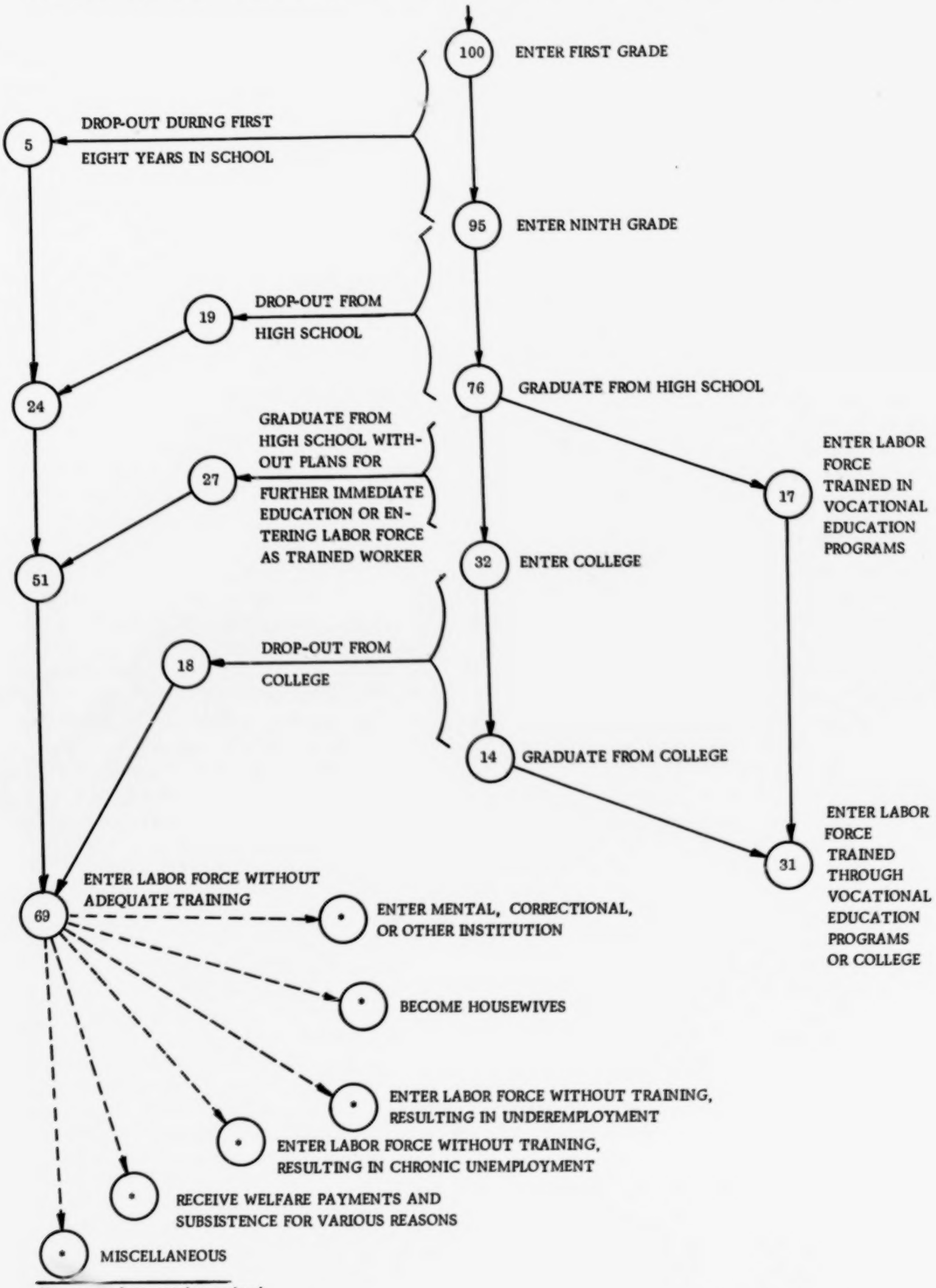
On the basis of our preliminary analysis of the existing system for vocational and technical education in Ohio, we may conclude the following:

(1) Education for work must be related to the goals of society and of the individual.

(2) Planning must be based upon accurate and useful data, and programs must be authorized and funded on the basis of these data.

*Because of the lack of substantive research data on the system of vocational and technical education in Ohio, a review of research on various projects completed in different parts of the United States suggested several other conclusions which have been omitted from this condensed report.

TRANSITIONS FROM ENTRANCE INTO ELEMENTARY SCHOOL INTO TRAINED AND UNTRAINED LABOR FORCE




*Exact numbers not determined.

(3) Education for specific jobs must be placed by training in occupational fields or clusters.

(4) The educational system must accept more responsibility for the post-school success and productivity of students.

(5) Education for work must be expanded to include a wider age range of students as well as a wider range of course offerings.

(6) Evaluation of education for work must be based upon the deviation between stated objectives and what is actually accomplished.

Assuming that the purpose of education is to enhance the dignity of the individual and to improve the individual's posture in the community, then the need for a more comprehensive program of work-oriented education is apparent. To begin the development of a significant program, a framework for a work-oriented educational system must be constructed. This framework is presented in the next section.

## A MODEL SYSTEM FOR WORK-ORIENTED EDUCATION

### Introduction

In formulating the objectives of an improved system for vocational and technical education, these assumptions were made:

(1) Each individual is entitled to the preparation needed to be productive in our society.

(2) To prepare the individual to be a productive member of society, society must know where it is going and specify this direction.

(3) The criteria of preparation and productivity must be established.

(4) Evaluation of the educational system must be based upon both cost-effectiveness and cost-benefit analysis.

Considering these assumptions, a series of planning seminars and workshops were held in the Columbus Laboratories of Battelle Memorial Institute to examine a number of alternative approaches to the improvement of vocational and technical education. From these seminars, we concluded that: (1) the concept of vocational and technical education was too limited, (2) the definition of vocational and technical education was based upon existing laws and organizational structure rather than on the needs of the individual, (3) the role of education is to increase the probability of successful transitions from one life-state to the next, (4) a new system must be developed, and a systems approach must be used to clarify the objectives and evaluate the attainment of the objectives, (5) the new system must be comprehensive and should be called, tentatively, work-oriented education.

Work-oriented education was selected because: (1) work, being broader than occupation or vocation, includes useful activity which is not income producing, (2) work-oriented implies a broader scope of program which would include training for employment without overemphasizing that training for each individual, (3) the use of work-oriented education as a descriptor seems advisable to avoid barriers because of the present rather well-defined meaning of vocational and technical education in Ohio.

A decision was made to hold a series of workshops to discuss and develop some basic directions for a work-oriented educational system. The results of these workshops and subsequent developments are:

(1) A list of broad educational goals or objectives for work-oriented education

(2) A list of factors to be considered in the implementation of objectives

(3) The specification of the primary system objective of work-oriented education

(4) The specification of selected objectives of components of the work-oriented educational system

(5) Recommendations for the implementation of objectives

(6) Recommendations for further research.

In the remainder of this report, the primary system objective, some component objectives, recommendations for implementation of these objectives, and recommendations for future research are presented. Certain areas were excluded because they will be considered in the continuing research project or because they were beyond the design of this research project.

## The Primary System Objective

The primary system objective for work-oriented education is:

> **EACH INDIVIDUAL, WHEN COMPLETING A WORK-ORIENTED EDUCATIONAL PROGRAM, SHALL BE ABLE TO DETERMINE THE LOCATION OF WORK RELATED TO THE TRAINING RECEIVED, TO SEEK OUT AND OBTAIN WORK, AND TO BE SUCCESSFUL IN TERMS OF BOTH IMMEDIATE PERFORMANCE AND PROGRESS WITHIN THE WORK SETTING.**

There are a number of significant implications associated with this objective, some of which are:

(1) By using the term "work" instead of occupation, we are including areas of useful activity which are not necessarily income-producing.

(2) Success is not predicated on job skills alone, but includes social and personality factors as well.

(3) Education accepts responsibility for a person's preparation for success beyond immediate employment.

(4) The education required to meet this objective is more than the existing system offers.

## Components of the Work-Oriented Educational System

To identify the components of the system which would contribute to the accomplishment of the primary system objective, it was necessary to refer back to the broad, educational objectives. These components as selected are (1) students, (2) instructional staff, (3) management-administration, (4) curriculum, (5) supportive services, and (6) facilities and equipment.

These components were studied and a description of the elements of each component was prepared. From this description, several conclusions were drawn that support the need for systematic study of each element in each component. A brief description of each of the components indicates that the concept of work-oriented education is more extensive than vocational education and technical training, and complete integration into the general curriculum is required in order to implement the primary system objective.

### Student

Careful consideration must be given to avoid placing barriers to limit the number or type of student to be enrolled in a work-oriented educational program. Because of the need for a more effective educational plan to prepare the individual for a productive life, it is essential that work-oriented education begin with the preschool child and be open to any individual who is physically and mentally able to work without any restriction because of age or previous education and experience. It is assumed that the overall effects of work-oriented education would be to (1) decrease the number of school drop-outs, (2) decrease the college drop-out rate by improving aptitudes for college or by directing students to choose nonbaccalaureate degree fields based on realistic goals, and (3) increase the number of semiskilled, skilled, and technical workers available to the labor force.

### Instructional Staff

To implement the primary system objective, careful consideration must be given to:

(1) The role of business and/or industrial work experience

(2) Preservice training of instructional staff

(3) In-service training

(4) Socioeconomic and professional needs

(5) Benefits of continuing education

(6) Career-development plans.

Also, the problem of negative attitudes toward any type of noncollege-bound education must be dealt with.

## Management

The management of work-oriented education includes these activities:

- Planning
- Organizing and authorizing
- Directing
- Controlling
- Regulating
- Evaluating
- Communicating.

The concepts and methods of modern-day management should be applied to the work-oriented educational system. This should allow the system to operate in an effective and efficient manner – in order to benefit the student. There is reason to believe that some activities of management actually conflict with leadership behaviors. If so, this conflict should be studied to determine which management functions cannot be given to individuals who have leadership responsibilities.

## Curriculum

The curriculum component of a work-oriented educational system should include the following elements:

(1) Preoccupational Curriculum

The content of this element is devoted to the development of attitudes and aptitudes necessary to a productive life of work.

(2) Occupational Curriculum

The content of this element is devoted to the development of the knowledge and skills necessary to a choice of occupational field and success in the work environment. Although attitude development will be included in the total program, it is assumed that some attitudes will be the by-product of instruction in the occupational curriculum.

(3) Nonoccupational Work Curriculum

The content of this element is devoted to the development of knowledge and attitudes about areas of work which are not necessarily income producing. This would include, as examples, volunteer work for various social agencies, being a housewife, and even the avocational or hobby-type work experiences.

The total curriculum must be extended vertically, i.e., down to preschool and into post-secondary schools; horizontally, i.e., into the areas of the general curriculum – when possible – to integrate all learning experiences; and in depth, i.e., to improve the quality and quantity of existing programs by deemphasizing unnecessary skill training and emphasizing broad experience essential to employment and work.

## Supportive Services

The various elements of the supportive services component are: (1) guidance and counseling, (2) social work, (3) attendance services, (4) psychological services, (5) psychiatric services, (6) speech and hearing services, (7) nursing services, (8) medical services, (9) advisory councils, and (10) community councils.

## Facilities/Equipment/Instructional Media

With respect to this component, the emphasis is on the effective use of existing facilities combined with careful planning for the construction of new facilities. Also, equipment should be purchased and used when it is appropriate to the instructional objectives. With emphasis on occupational fields for advanced-level training, the use of facilities and equipment will change with a need for flexibility in interior construction and in mobile training modules with flexible exteriors.

Instructional media have been studied in different tasks of the current Ohio Department of Education project being reported by Battelle Memorial Institute. No further study of the component is planned at this date, although the continuing project is amenable to a partial study of facilities and equipment if needed.

## Factors to be Considered in Implementation of Primary System Objectives

These factors were identified and specified through the process of interviews with educators, review of literature, and in the workshops held in the Columbus Laboratories of Battelle Memorial Institute during August and October.

(1) The technological changes of the last third of the twentieth century will require, for many, continuous training both for progress within a job or even to maintain an employment status quo without advancement possibilities.

(2) There are massive industrial and business changes which are limiting the absorption of traditionally trained manpower.

(3) Extending the benefits of work-oriented education to all will place a heavy burden on the entire educational system and especially on the planners at the State level.

(4) Constant modifications in the work-oriented system must be made because of the shifting of labor markets in the region served.

(5) For planning purposes, labor markets must be viewed as a regional factor rather than merely as a local factor. (Note: In the regionalization of work-oriented education and, particularly, vocational and technical education, this factor is important in planning programs to be offered and would increase the probability of relevant training.)

(6) Because of mobility and commuting patterns, labor markets should be used as indicators of need rather than predictors of employment.

(7) The interrelationships of various occupational fields in which the individual could be prepared must be balanced with projected manpower needs over a period of time.

(8) The individual's achievement level in an occupational field program must be compared to the individual's potential in determining whether the primary system objective is being attained with respect to this individual.

(9) The primary system objective shall also apply to those individuals who leave a program before formally completing the necessary degree requirements (drop-outs).

(10) Inasmuch as many college programs may be perceived as work-oriented education, the primary system objective also would apply to students who are seeking baccalaureate degrees. (This aspect of education, however, is beyond the consideration of this study.)

## Identification of Component Objectives

As previously indicated, there are six components of the work-oriented educational system which are essential to the accomplishment of the primary system objective, and each of these components has several objectives. Some of the objectives of these components and some recommendations for the implementation of these objectives are presented below.

## Component Objectives: Students

These objectives indicate that any individual will be permitted to enroll in work-oriented education programs which will provide instruction and guidance to increase the probability of a productive life.

(1) Each student, when completing a work-oriented educational program, shall demonstrate that he has developed the basic skills (specified in behavioral terms for a particular occupational field) necessary for an entry-level position in various occupations.

(2) Each student, when completing a work-oriented educational program, shall be able to state in written or oral form the requirements for work in an occupational field in terms of knowledge and entry-level skills and be able to generalize and relate his ability level to various work possibilities.

(3) Each student, when completing a work-oriented educational program, shall demonstrate the ability to study the labor market, identify work opportunities, and seek out and obtain work related to his training.

(4) Each student, when completing a work-oriented educational program, shall complete an outline on which the work being contemplated is described, other opportunities which have been considered and rejected are noted, alternatives for progress in the work environment are stated, and the need for additional education and training is projected and planned.

(5) Each student, when completing a work-oriented educational program, shall demonstrate in various types of simulated work environments an ability in the interpersonal relations required in the occupational field for employment, for success at a given level, and for advancement.

(6) Each student, during the time enrolled in a work-oriented educational program, shall indicate in written or oral form the relationship of a chosen occupational field to the economic factors associated with that field.

(7) Each student, during the time enrolled in a work-oriented educational program, shall be able to list the regional services available to individuals and the procedures necessary to tap those services when needed.

(8) Each student, during the time enrolled in a work-oriented educational program, shall be able to list the various types of educational institutions in the State, to describe their services as applicable to the individual's future plans, to relate education to possible needs, and to outline steps necessary to locate an educational institution for additional help when and if needed.

(9) Each preschool student shall be encouraged to simulate a variety of adult work situations during semistructured play periods designed to establish a value system about work but not to form specific occupational goals/choices.

(10) Each elementary student shall perform a variety of physical and mental tasks designed to develop aptitudes for various types of work by instruction during critical periods of growth.

(11) Each elementary student shall begin to prepare a file of information on the requirements and opportunities in various occupational fields in which he is interested; this file shall accompany the student into junior high and senior high school, where it will be updated continually to serve as a constant reference for planning about a life's work.

(12) Each student, in grades 7-10, shall demonstrate through periodic examinations in written or oral form the knowledge, skills, and attitudes which are essential to success in various work environments.

(13) Each student in grades 11-12 who selects and identifies a post-high school career choice and is noncollege bound shall perform those tasks related to successful work experience in a given occupational field at designated times during the training period.

(14) Each student who completes a secondary work-oriented educational program shall be eligible for admittance to specialized technical training programs related to interests, labor needs, and previous education.

## Factors to be Considered in Implementation

These factors were identified and specified through the process of interviews with educators, review of literature, and in the workshops held during the project.

(1) If work-oriented education is to be effective, labor market projections must be used to guide the student in the development of broad occupational interests.

(2) It is virtually impossible to predict specific manpower needs, and most projections can be made only in occupational fields.

(3) The acceptable level of cost-effectiveness in educational programs must be established as an indicator for changes in existing programs, for evaluation, and for public accountability.

(4) The problem of individual differences must be considered in planning work-oriented education, e.g., interests, verbal and nonverbal intelligence, aspirations, emotions, etc.

(5) When disadvantaged students are identified, special emphasis must be given to increasing the opportunities for successful work experience.

(6) Union quotas, hiring practices, and apprenticeship policies must be included in individual planning for a life of work.

(7) Inasmuch as the establishment of goals about work and education begin at a very early age, work-oriented education should begin with preschool children, with particular attention given to those children who are in the second and third generation of welfare subsistence.

(8) It is important that the student be aware that total commitment to a specific life plan for work at an early age is unnecessary. The student should be instructed in the advantages of developing a wide range of options from which positive work and education decisions can be made.

(9) The type of data essential in developing realistic goals is not readily available.

## Component Objectives: Instructional Staff

The component objectives for teachers were not specified during this initial study although certain areas were identified during the workshops. These were:

(1) Preservice Education: Because the concept of work-oriented education is broader than traditional vocational education, two areas of preservice

training must be studied: (a) the formal, baccalaureate degree training that contains the content necessary for the attainment of the objectives of the system and its components and (b) the value of experience in contributing to instructional excellence.

(2) In-Service Education: The area needing investigation here is the use of in-service educational programs to develop instructional effectiveness and to encourage teachers to serve as models to all students.

(3) Staff Welfare Practices: Areas identified here which require additional research are: (a) health needs, (b) psychological needs, (c) social needs, and (d) economic needs.

(4) Continuing Education: The value and appropriateness of post-baccalaureate education should be studied with particular emphasis on nondegree seeking training.

(5) Career Development: There is a rising interest in investigating various ways to study the professional status of teachers, advancement opportunities, and the utilization of paraprofessionals in the work-oriented program.

(6) Previous Experience: The importance of business and industrial job experience should be studied to determine the replacement value of that work for academic experiences.

Some of the tentative objectives of the Instructional Staff are that:

(1) Instruction shall be effective and efficient based upon a comprehensive program of research and evaluation.

(2) Teachers shall assume part of the responsibility for structuring the classroom to maximize opportunities for individualized instruction.

(3) Each teacher shall work for competency in (a) subject matter field, (b) industrial and business experience, and (c) techniques of instruction.

Additional research will be conducted in the second phase of this study to specify the objectives of instructional staff and to select factors for consideration in the implementation of the objectives.

## Component Objectives: Management

It is vital that any attempt to introduce the concept of work-oriented education should include explanations about the global nature of the system. Management-administration must clarify the constitutional right of each individual to receive that education which would permit the development of a wide range of occupational choices leading to the individual achievements necessary for dignity and security. The management of a work-oriented educational system requires the application of modern concepts and methods to permit an effective and efficient operation. These objectives are oriented toward that goal.

(1) The Ohio Department of Education shall provide communications networks necessary for wide public support and acceptance of the work-oriented educational systems.

(2) The Ohio Department of Education shall use a program decision model for the development of new activities and shall encourage research to modify and expand existing programs. Evaluation of work-oriented education programs shall be part of the feedback process to increase the effectiveness of teaching, to change the scope of the curriculum, and to improve the effectiveness of administration.

(3) The administration of work-oriented education shall offer staff career-development programs to insure a high degree of staff involvement with the task at hand as well as to maintain and increase instructional effectiveness.

Comment: As this objective will be studied at length in the continuing research activity, no recommendations are made concerning implementation.

(4) Administrative units for a work-oriented education system – which include provisions for difference in community attitudes, tax base, and student population – shall be established.

(5) The Ohio Department of Education shall have the responsibility for authorizing programs that are consistent with national, State, and individual goals and justified by manpower projections for each student enrolled in work-oriented educational programs.

Comment: Program consistency is one of the key factors in this objective. A large group of individuals might demand training in an occupational cluster which, upon inspection, would reveal that the individuals' goals are inconsistent with State or national goals. For example, a group might demand oceanography as a cluster for further training; this would be in line with our present national goals, but Ohio might have little interest in preparing people for careers in oceanography if most would have to leave the State to find employment.

## Factors for Consideration in Planning Implementation of Management Objectives

These factors were identified and specified through the process of interviews with educators, review of literature, and in the workshops held in Columbus.

(1) Preservice education should be evaluated to determine if existing programs provide adequate work-oriented preparation.

(2) In-service activities should be reviewed to determine the role of in-service training in overall career development.

(3) Continuing education should be reviewed in terms of benefit to the system, individual growth, professional advancement, and career possibilities.

(4) Alternative methods of recruiting, training, and retraining professional, paraprofessional, and nonprofessional personnel should be reviewed.

(5) Placement and retraining services should be provided to offset the upheaval when training in occupational clusters of fields is given emphasis, when programs are funded and authorized on the basis of manpower projections, and when a surplus of teachers occurs.

(6) Provisions should be made for the training of professional and nonprofessional research personnel, particularly in vocational and technical education, to support management decisions.

(7) An evaluation should be made of policies in the existing programs of vocational and technical education requiring commitment of an occupation before enrollment in a program, limited freedom of shifting interests, the time blocks, and minimum enrollment before reimbursement.

(8) Professional public-relations organizations may be required to mount a successful campaign to counteract negative attitudes toward vocational education.

(9) A careful review must be made of the relations between work-oriented education and: (a) general education, (b) technical education, (c) business and industry, (d) labor unions, (e) professional educational organizations, (f) state employment service, (g) private and public schools, and (h) communities.

(10) For effective planning, careful consideration must be given to improving the involvement of community, parents, and children in providing a wider, more comprehensive work-oriented education.

(11) The interrelationships of cities and their suburbs must be considered with incentives provided to both for cooperation in providing a broader based work-oriented education program.

(12) The attitudes of many teachers toward vocational education and their unwillingness to change those feelings are significant and should be considered as a primary target for future action and study.

(13) There is a lack of decisive action on the part of educational leadership and State government to establish priorities for work-oriented education.

(14) Individuals who defend the past decisions of vocational education and fail to adopt a strategy for change prevent the development of a consensus concerning the goals of education and its public accountability.

(15) The needs of both youth and adults must be met.

(16) Projected manpower needs must be used.

(17) The cost-effectiveness of existing vocational programs must be studied.

(18) Requirements for entry into jobs must be studied.

(19) Problems of staff recruiting and training must be viewed within the establishment of new districts.

(20) The effect of new administrative units on local school districts may be important.

(21) The rural administration problem centers around the number of students required to offer a given program.

(22) The urban administration problem is to finance and organize to obtain quality education.

(23) There is a need for assuring vocational graduates that programs will meet minimum State standards for graduation credits.

(24) Considering the effects of new administrative units, there may be some impact on community structure as well as on the local economy.

(25) Work-oriented education must be made particularly attractive to those students and their parents who are not now enrolled or who are not planning to enroll in existing vocational educational programs.

(26) The improvement of the image of work-oriented education as a contributor to future productivity may overload the instructional system if it is effective.

(27) Improvement of attitude must begin at an early age; elementary students as well as preschool children must be given appropriate instruction in the positive aspects of work-oriented education.

(28) To improve attitudes, the breakdown in communication between academic-general-education proponents and vocational-education proponents must be resolved.

(29) Smooth transitions for moving from high school into a technical training institute must be provided.

(30) Action must be taken to establish better lines of communications with business and industry, particularly with reference to employment practices and attitudes about the quality of vocationally trained students.

(31) Cooperative relations between labor unions and work-oriented education should be encouraged.

(32) Professional and educational organizations and their members should be encouraged to adopt the principles of work-oriented education.

(33) The extension of work-oriented education to the adult population should have a positive effect on attitudes toward work-oriented programs in the high school.

(34) The characteristics of communities should be surveyed in planning any improvement in communications networks.

## Component Objectives: Curriculum

A preliminary investigation of the curriculum of vocational and technical education combined with opinions of recognized authorities in the field has led to the development of the following objectives. However, the complexity of providing appropriate programs suggests that these objectives are quite tentative and further study needs to be undertaken.

(1) Work-oriented themes shall be integral parts of the content of the general curriculum.

(2) The administration of work-oriented education shall determine, through follow-up studies of graduates and employers, the appropriateness of its curriculum as related to the requirements of work, and then make modifications through a self-regulating technique.

(3) The work-oriented curriculum shall include preoccupational content as part of general school curriculum beginning with preschool activities. The content shall be concerned with the development of aptitudes for work and the learning of appropriate attitudes essential for success in a work environment.

(4) Work-oriented education shall include occupational curriculum beginning in elementary school. The content shall be concerned with (a) the development of knowledge about work, (b) the development of knowledge and skills essential for the student in grades 11-12 to achieve the primary objective of work-oriented education in an occupational field or cluster, and (c) the development of attitudes related to the particular occupational cluster being studied.

(5) Work-oriented education shall include nonoccupational work curriculum beginning in elementary school. The content shall be concerned with the development of skills and knowledge essential to success in work that is not devoted to gainful employment but which is a contribution to a productive life.

(6) The work-oriented curriculum shall be relevant to the real world of work and must not be restricted by the imposition of traditional requirements of time blocks and inflexible policies.

(7) After placing appropriate emphasis on work-oriented education in the general curriculum, recommendations to the Ohio Department of Education shall provide the necessary data to permit appropriate decisions to be made regarding increases or decreases in the scope of the curriculum.

(8) The Ohio Department of Education shall have the responsibility for defining occupational fields or clusters and developing the curriculum guidelines based, in part, on the job analysis techniques developed by the U.S. Department of Labor.

(9) The Ohio Department of Education shall require each program and the management administering the program to restructure the curriculum to provide broad educational experiences in occupational fields and clusters.

(10) Changes in the curriculum should be made following a curriculum development model which includes at least two stages of pilot programs with revisions before actual implementation of a program throughout the State.

(11) The work-oriented curriculum shall include the comprehensive information necessary for each student to formulate realistic goals, including a flexible plan for work and continuing education.

(12) The work-oriented curriculum must be based on the individual's need for immediate post-school work as well as for the future.

(13) The work-oriented curriculum shall provide personalized and individualized instruction in an attempt to maximize each student's rate of learning.

Comment: The purpose of these objectives is to establish a formal relation between the development of occupational choice and the influence of curriculum content on those choices. For example, early experiences in reading could have some work-oriented materials included as part of the general reading curriculum. Curriculum has been selected as an area for additional research in the second phase of this study.

## Factors for Consideration in Planning Implementation of Curriculum Objectives

These factors have been established through interviews with educators, review of literature on curriculum change, and from the suggestions of workshop participants during the past weeks. The list is not complete but suggests a framework for future study.

(1) The curriculum should have an accurate orientation toward the world of work. This would include both thematic content in preoccupational and nonoccupational work curricula as well as training in occupational fields or clusters which have high relevance to the outside world.

(2) Action should be taken to increase the feedback of employers and their needs as a modifier of the content of the curriculum.

(3) Curricula should reflect labor market projections, and the content should provide an adequate base to ensure immediate placement and progress on the job or in a work setting.

(4) An accurate appraisal of the world of work must be included as a guide for any changes in curriculum.

(5) There must be increased communication among the educational system, potential employers, and those individuals who will be affected by changes in the curriculum.

(6) Any change in curriculum must be relevant to the requirements of work performance.

(7) Curriculum change must accurately reflect the current and short-range changes in the scope of the job.

(8) Any change in curriculum must consider the problem of adequate depth in a given subject and provide for general competency in initial placement and advancement.

(9) The individual's occupational goal should be considered in decisions about the curriculum.

(10) The actual need for specific work skills must be established.

(11) Any changes in the scope of the curriculum are presently hard to justify because of the lack of empirical evidence about the effectiveness of existing programs.

(12) There is a lack of qualified personnel to staff any expansions in programs.

## Component Objectives: Supportive Services

The area of supportive services was not included in the present research project. However, certain objectives could be identified because they became apparent as integral parts of the work-oriented educational system. These objectives are definitely tentative and the area of supportive services needs further investigation.

(1) Guidance services: The guidance service shall assume major responsibility for placing each student completing a work-oriented education program in work related to his training.

(2) The guidance and counseling service shall provide the information and support necessary for each student to formulate realistic goals based on an awareness of his or her ability, an up-to-date appraisal of the labor market, and minimum requirements for adequate living standards.

(3) The guidance and counseling service shall provide the assistance to enable each student to enroll in programs consistent with his individual goals.

(4) The guidance and counseling service shall be assisted in its function by a high-speed computer which would match general characteristics of students, requirements for employment in occupational clusters, and projections of needs and surpluses in the labor market.

(5) The guidance and counseling service shall have the responsibility for developing close relations with the State employment service and area business/companies.

Comment: Other areas to be considered in the continuing research project are: (a) social work services, (b) attendance services,

(c) psychological services, (d) psychiatric services,
(e) speech and hearing services, (f) nursing services,
(g) medical services, and (h) advisory services.

Factors for Consideration in Planning
Implementation of Guidance Service Objectives

(1) The purpose of these objectives should be to maximize the role of supportive services in the guidance and counseling area and not to impose an arbitrary and mandatory requirement on the student unless it is fruitful. That is, the student will be free to make his own decision, but the guidance service must be aware of the implications of such a decision, communicate those factors to the student, and maintain an information file on the student to provide assistance at any point after graduation.

(2) Organizations such as the Bureau of Employment Security and the Bureau of Vocational Rehabilitation must be involved in the implementation of these objectives.

(3) The formulation of realistic goals does not mean that the goals are always attained. While the process of formulation is important, the primary importance is the development of the flexibility to modify goals when desirable – on the basis of an accurate evaluation of abilities and potential.

(4) Guidance and counseling should consider the influence of the family on occupational aspirations.

(5) The student's interests must be viewed as subject to the normal pressures of the peer group.

(6) The establishment of realistic goals should be based upon an objective analysis and an analysis of the skill level required for personal work.

(7) Although the establishment of goals might appear to be fairly realistic, a thorough study of the possibilities for employment might indicate that certain factors could intervene to prevent the attainment of the stated objective.

(8) No student shall be restricted in his desire to change goals within a career field or to change fields.

(9) Accurate placement in work-oriented education course work is based upon the accurate assessment of abilities, aptitudes, and attitudes.

(10) Goals of employers may interfere with the implementation of the component objectives.

(11) Goals of employee organizations and unions may conflict with the student's formulation of goals and an understanding of careers.

(12) Individual goals may not be compatible with opportunities.

(13) The load for each counselor must be of the proper size to permit achievement of objective.

(14) Students who drop out of school must be given as much consideration as those who remain in school.

(15) Counselors must be aware of regional labor markets and manpower needs and projections.

(16) Students must have the opportunity to consult with counselors frequently or when necessary.

(17) Qualifications for a given job must be known.

(18) The need for achievement must be considered in attempting to place a student in a position prior to his development of a relatively mature attitude about work.

(19) Counselors need more experience in business and industry in order to effectively place students in jobs.

(20) Counselors need updating of training techniques and knowledge of the changing needs of a technological society.

(21) Funds may not be available for these component objectives to be implemented.

(22) Counselors may not want to implement these objectives.

## Component Objectives: Facilities/Equipment/Instructional Media

Facilities often have dictated the education that students have received. This has come about as a result of improper planning and rigidity on the part of decision makers. While this area was not given emphasis during this study, these objectives emerge in the workshops and subsequent conversations. In no way can these objectives be taken as ready for implementation; they can serve only as a general guide for future action. At the present time, no further research in this area is anticipated until the administrative districts for work-oriented education have been established.

(1) Facilities shall be constructed that are designed to respond to changes in curriculum, with the possibilities of multiple use.

(2) Facilities shall be constructed to permit efficient year-round use.

(3) Existing facilities shall be modified to provide instruction in one or more occupational clusters.

(4) Facilities shall be designed for maximum community involvement and should be aesthetically pleasing as well as instructionally functional.

(5) New facilities should be constructed near highways and public transportation but should be relatively free from heavy local traffic patterns.

(6) Facilities shall be designed so that future expansion can occur without disruption of the learning environment.

(7) Offices shall be provided for all members of the instructional staff.

(8) Equipment shall be purchased when the need for instructional purposes has been established by the research arm of the system.

(9) Consideration should be given to the use of work-environment simulators as a relatively inexpensive alternative to the purchase of heavy equipment which is subject to obsolescence and cannot be justified on a cost-benefit basis.

## AN OBJECTIVE ANALYSIS OF ALTERNATIVE ADMINISTRATIVE UNITS FOR WORK-ORIENTED EDUCATION

### Introduction

This subtask of Battelle's research program for the Ohio State Department of Education (ODE) is intended to assist the ODE in establishing a set of regions or administrative units within the State. It is understood that these regions, when acceptable to the ODE, will be proposed to the State Legislature for effective management of Ohio's present vocational-education effort as well as the proposed work-oriented educational system. The present report is intended to set forth: (1) the context within which this regionalization exercise has been carried out, (2) the methodology employed, (3) the results achieved, and (4) the degrees to which these regional lines may be altered without significant loss of objective validity.

### The Purpose of Regionalization

Although it would be difficult – in fact, almost impossible – to indicate in advance all the uses to which sets of regions such as these might be put, they are intended to serve several explicit purposes. The discussion that follows, while not exhaustive, probably includes the major purposes which these particular regions will serve.

### Administrative Units

An important function of any regionalization for a government agency is administrative. There is always a need for "middle" management, for convenient statistical reporting units, and for planning units that are small enough to be more homogeneous than the State as a whole. This is just as true of work-oriented education as of any other state government activity.

## Funding Units

In the present instance, a very important reason for regionalization is financial. Federal support of certain vocational and technical programs requires the existence of units to which these funds (and their state counterparts) can be channeled. Such units must be big enough to mount and support (from local sources) a comprehensive program and must have formal existence as a fiscal entity.

## Program Unit

Each of the contemplated work-oriented education units is intended to be sufficiently large and financially capable to establish and maintain a comprehensive program. Moreover, for the individual units to be viable – and to continue to receive State and/or Federal funds – each must have an active administrative organization actually operating such a program.

The adjustment of the work-oriented program to the locality can best be made at a subregional level large enough to support the program, but small enough and delineated in such terms as to be reasonably homogeneous. If it were not for this last need, almost any collection of lines on a map would suffice for administrative units.

## The Need for Decentralization

Efficiency calls for centralized, often monolithic organizations, while democracy calls for decision units which are small and close to the people they purport to serve. Ordinarily, therefore, administrative units such as these represent an uneasy set of compromises between size and efficiency on the one hand, and responsiveness to the popular will on the other.

The present research program has resulted in a series of regional subdivisions of the State, ranging from a relatively coarse grid of 4 districts to a fairly fine-grained grid of 45 districts.

## Some Methodological Considerations

A subregion is created by combining two or more basic geographic units into a larger unit; at times a single basic unit may be designated a subregion by itself. Therefore, the choice of the basic unit becomes an important determinant of the shapes, sizes, and characteristics of the subregions as finally delineated. Before the ultimate delineation can be undertaken, a series of questions must be faced and at least provisionally answered. They are:

(1) What basic units should be chosen for aggregation?

(2) What criteria should be used for determining the validity of any suggested subregion?

(3) In terms of what set of variables should the basic units be combined?

(4) How can the joint significance of a set of different variables be expressed and used to guide the regionalization process?

The answers to these four questions within the context of this research project comprise the remainder of this methodological discussion. They also provide the background against which the several maps presented in the Task Report take on full meaning.

## The Basic Units

These units (also to be termed "building blocks") are fundamental to the success or failure of a given subregionalization. In the present instance, only two alternatives – counties and local school districts – suggest themselves for the role.

School districts constitute a logical base for any education-related set of subregions. First, they constitute the geographical framework within which each local educational program is carried forward. Second, they are the natural administrative and reporting units for this entire process. In some instances, school districts in Ohio are not contained within any single county, many cross county lines in a manner which often appears to have been a historical accident. More often, however, the school districts are drawn with some reference to county boundaries.

There are several disadvantages to the use of local school districts as our fundamental building blocks. There are over 600 such districts in Ohio, varying from county-sized areas to small villages or suburban enclaves. Historically, there has been a strong tendency for small districts to be consolidated into larger ones capable of supporting broader and more varied educational programs.

These localities are often the foci of strong community rivalries and jealousies. In-group/out-group tensions usually are quite strong at the local level. Thus, in many instances, what might otherwise be a logical combination of school districts might have to be ruled out for less than logical reasons.

Finally, a major disadvantage of the school district as a regional building block derives from the lack of necessary statistical data (in terms of which regions should be assembled) on a school-district basis. The socioeconomic statistics which should guide our efforts (see below) cannot be obtained for the typical school district.

Counties have several persuasive advantages as regional units. As there are only 88 counties in Ohio, a certain amount of useful consolidation would be achieved merely by designating each county as an administrative unit. In Ohio, as in other states, the county seems to be riding "the wave of the future" with respect to the school consolidation movement.

The county also is a viable administration unit which has a full range of organizational features, legal powers, and the like. And finally, the county is a standard statistical reporting unit by federal and state statistical agencies.

On the negative side, many Ohio counties are not now directly involved in the day-to-day processes of education. Moreover, they may not have full and direct access to the physical facilities of the educational system.

In summary, there are distinct advantages to the selection of the county, rather than the school district, as the basic building block from which administrative units will be built. At this time, counties have been used in all proposed sets of districts for work-oriented education.

## The Establishment of Criteria

A wide range of regional boundaries can be drawn on a map. The problem is to know which set of regions is best. "Best", however, implies some kind of purpose to be served, and the existence of such a purpose in turn provides the criterion by which any particular set of regions may be judged.

Ideally, the scientist/researcher should apply rather than generate the ultimate criteria for regionalization. In the absence of a specific set of criteria, the following list has been adopted.

### Compactness

Each region should be as small and as nearly circular as is possible within the limits of the geographical units.

### Contiguity

For administrative purposes, it is proposed that all the units included within the same region or district be contiguous, and that no isolated subunits of other regions be mixed in with them.

### Historical Association

It is assumed that there are many intangible relationships which can be summed up in this term. Historical association or the orientation of certain geographical units towards a particular center, in contrast to that of others toward a different center, may well summarize many historical experiences and indicate the ultimate impact of a large number of minor variables.

### Homogeneity or Complementarity

All the various elements which are combined to create a region should have something in common with each other. While perfect homogeneity probably cannot be achieved within even a given county, much less a collection of counties, the geographical units combined into a particular region probably should tend to be more like each other than like outside units and more distinctly different from outside units than from each other. One of the most important reasons for this criterion is political: To the degree that a proposed region is homogeneous, it will be more likely to function smoothly and to be free of schismatic tensions. On the other hand, there may be occasions in which dissimilar counties have to be combined in order to obtain enough students or enough financial

support to assure a viable work-oriented educational program. When this situation arises, complementarity may override homogeneity as a determining factor.

## Student Population

The region should contain enough potential students based on existing enrollments to support and justify a comprehensive work-oriented educational program. Several sources have stated, however, that a comprehensive program could be supported by any system in which there were at least 5,000 and an optimal 10,000 students enrolled in grades 9-12. These two enrollment levels have been adopted as alternative criteria without judgment as to their ultimate validity and without commitment of other research results.

## Financial Resources

The individual regions should be financially able to provide local support for a work-oriented educational program. However, we have no assurance as to the exact fiscal base upon which Ohio counties may draw in the future to finance their activities. In general, existing situations seem to indicate that a property tax base, as currently defined and assessed, of about $30,000 per enrollee in grades 9-12 will suffice for local support as currently defined. We have adopted this figure – again without commitment – as a criterion for regionalization.

## Political Feasibility

Any government entity is part of the political process. Therefore, as indicated above, it becomes extremely important that we avoid wherever possible the combination of units whose populations have longstanding antipathies toward each other or which have other hindrances to smooth intradistrict relationships.

## Variables for Setting Up the Administrative Units for Work-Oriented Education

There are many variables that can be incorporated directly into the regionalization process as measures of one or more area characteristics relevant to the above criteria. In addition, there are other variables which cannot be utilized directly as characteristics, but which should be considered as means of applying the criteria. The choice of variables for incorporation into our index of regionalization is controlled by two things: (1) the availability of generally consistent and comparable statistics and (2) the relevance of each particular variable to the problem at hand.

Since there are so many different kinds of variables useful in a given regionalization problem, separate selections must be made for each particular situation. The purpose for which one particular set of regional boundaries is being drawn may be completely different from that governing another, so that a different set of variables probably will have to be chosen. Moreover, since the criteria by which one set of regions is evaluated may differ from those that apply to another, the variables that embody the criteria also can be expected to change.

## Broad Types of Variables for Vocational Education

Location. Our locational variables are simply the ordinates of each area's geographical center from an arbitrary point of origin. In establishing the administrative units, the point of origin was set at the lower left-hand corner of a rectangle which just contains the State of Ohio. There are two locational variables: (1) the horizontal distance from the origin to a point directly below the unit's geographical center, and (2) the vertical distance from that point up to the center of the unit. This gives each county or school district a pair of characteristics – its horizontal grid location and its vertical grid location – which, taken together, are unique for that one unit, distinguish that unit from all other units in the State, and allow us to introduce the element of contiguity into the regionalization process.

Jobs. This project was undertaken for the purpose of establishing administrative units. Therefore, it is important that our full description of each geographical unit includes something about the types of work available therein. It can be argued that, if counties are combined which are alike in their labor requirements, this should lead to more efficient use of facilities than might otherwise be the case. This argument should not lead us to overlook the fact that persons who are trained in one part of the state may migrate to an entirely different part of the state (or even to a different state) where an entirely different selection of work is available. Nevertheless, some further efficiency might be achieved by considering the structure of the job market in each of the several area units being combined into a given region for the administration of work-oriented education.

For example, the agricultural or nonagricultural nature of a county's industry is an important indicator of the kinds of training which might be emphasized. This can be measured by the proportions of county population living in farm and nonfarm environments, or by the proportions of total employment provided by farms or nonfarm industries, or by the proportion of the tax base made up of agricultural assets. Any one of these several characteristics probably could be used, because they will tend to correlate with each other.

A second job-related characteristic is the proportionate prevalence of white collar versus blue collar work – defining the former to embrace clerical, sales, administrative, managerial, and professional workers. Another way of measuring this same area characteristic might utilize the proportionate socioeconomic composition of the nonagricultural population.

Income. The average income received by the population of a county or district is an extremely important measure of its level of prosperity, its level of poverty, the degree to which its assets and resources are being fully utilized, and/or the types of work for which its people should be trained. In a low-income area we expect to find a high degree of unemployment, a disproportionate number of hard-core unemployed, and higher-than-average proportions of those particular minorities that are subject to serious economic discrimination. All this means that the educational problems of the low-income area will be quite different from those of a high-income area. Moreover, the people in low-income areas often display sociopolitical postures and attitudes which make it difficult for them to cooperate smoothly with areas of markedly higher income

levels. Thus, it could prove advisable to combine areas of low income, rather than to mix them indiscriminately with others of entirely different income levels.

Tax Base. The size and composition of the tax base are both valuable characteristics which should be taken into account in this regionalization project. We have already mentioned the proportionate contribution of agricultural property to the tax base as being an important measure of industrial composition. In addition, as pointed out above, the tax base, when expressed in per capita or per pupil terms, becomes a very important indication both of an area's ability to support a work-oriented educational program and especially of the ability to finance new capital facilities.

Voting Record. Voting record is probably one of the better available objective indicators of the political feasibility of establishing particular combinations of counties. If we assume that counties which vote similarly on a given statewide issue are likely to vote similarly on other issues, we can utilize the records of particular recent votes as approximate measures of the political characteristics of an area. These measurements can be expressed either in terms of the percentage of the total vote which was for or against a given issue or in terms of the proportion of the total voting population registered in a major party. The final need to incorporate voting records into the regionalization process as an explicit measure of the political feasibility of particular combinations may prove to be quite low, however, since many other characteristics also reflect political points of view. For example, suburban residents (or high-income groups or white-collar groups) have tended to be more conservative in their voting behavior than those of the inner city (or low-income or blue-collar groups); on the other hand, the political activity of suburbanites (etc.), probably is much higher than that traditionally associated with the population of the inner city (etc.).

Commutation Patterns. Commutation patterns also provide an important, though often difficult-to-measure, characteristic that is highly relevant to the districting problem. For instance, people who commute to a common employment center will tend to have more similar vocational interests than those who commute elsewhere. The bedroom counties for a given urban-industrial center thus will tend to have common education problems. Moreover, the citizens of those counties probably will tend to associate their interests with those of the common center. Thus, a combination of geographical units which takes this relationship into account probably will be more viable than one which violates it.

## Initial List of Variables

The variables for the present regionalization project were collected first on a county basis because of our feeling that counties were more likely to be the best area units. Most of these same variables will not be available by school district. In fact, almost every variable which measures a nonschool characteristic is likely to be unavailable on a school-district basis.

The following 24 variables were utilized in this regionalization project. Several of them were not used in the final analysis, but entered into the computation of ratios or other measurements which were. These 24 variables are listed below in no particular order, with brief indications of their nature and source:

(1) The x-axis: This is a locational measurement from the lower left-hand point of origin to a point directly below the center of the county.

(2) The y-axis: This is the vertical distance from the center of the county down to the x-axis.

(3) Total 1966 population: This is a county-based estimate derived by Battelle. It was taken from the Battelle report on local government tax revision.

(4) Average daily membership (ADM): This is a 1966 figure from the Ohio Education Association.

(5) The ratio of ADM to total population (Item 4 divided by Item 3) for 1966: This has been used as a general population characteristic, that is, the ratio of young people to all persons.

(6) Unemployment rate 1967: This figure, unemployed as a percent of labor force, is from the Ohio Bureau of Employment Security.

(7) Total high school enrollment: Enrollment in grades 9-12 is taken from the Department of Education statistical report for school year 1966-67.

(8) Percentage of 16-17 year olds enrolled in high school in 1960: This also is taken from the Department of Education.

(9) The aggregate county personal income, 1969: Estimated for 1969 and reported in the above-mentioned Battelle research report.

(10) 1969 income per capita: From the same source as Item 9.

(11) Agricultural property as a percentage of total property valuation for tax purposes in 1965: Also from the above-mentioned Battelle report.

(12) The total school tax levy in 1967: From the Ohio Expenditure Council.

(13) Total school expenditures in 1966: From the financial report of school system.

(14) School expenditure per pupil in ADM: Derived by dividing Item 13 by Item 4.

(15) Total property tax evaluation, 1966: From the above-mentioned OEA research report.

(16) Valuation per pupil in ADM: Derived by dividing Item 15 by Item 4.

(17) State foundation moneys granted for school purposes, 1966: Source, the above-mentioned financial report.

(18) State foundation money per pupil in ADM: Derived by dividing Item 17 by Item 4.

(19) Federal funds going to the counties for school operation, 1966: From the same financial report.

(20) Federal funds per pupil in ADM: Derived by dividing Item 19 by Item 4.

(21) Percent of total income derived from farming, 1965: Source, Bureau of Research, The Ohio State University.

(22) Percent of nonagricultural employees who are employed in manufacturing, 1960: Source, U.S. Census of Population, 1960.

(23) Percent voting "yes" on a state-wide school issue, 1966: Source, Report of the Secretary of State.

(24) Taxes levied for school purposes per pupil in ADM: Derived by dividing Item 12 by Item 4.

Several of these items are absolute numbers which vary with the size or density of population of the particular county rather than with the socioeconomic characteristics of the population within that county. For that reason Items 3, 4, 7, 9, 12, 13, 15, 17, and 19 were not used in the final regionalization, but entered only into the derivation of ratios or percentages which were used as working variables. A number of other indicators were examined but not utilized because they were closely similar to variables in the above list.

## The First Set of Districts

### Criteria

The first regionalization was undertaken with the intention of producing the largest possible number of districts from the 88 counties in terms of two main criteria: (1) the number of pupils enrolled in the high schools should be at least 5,000 for the entire district in order to support an integrated work-oriented education program and (2) each district should provide the financial support of a tax base of at least $30,000 per high school enrollee. A subsidiary criterion was also adopted, namely (3) that counties which had enough pupils and a large enough tax base to support a program by themselves should not be combined with any other counties unless the low enrollment or low tax base of the other counties made it absolutely necessary, and that the number of these combinations would be kept as small as possible.

There were 30 counties which appeared capable of supporting a district alone. In the final regionalizations, 17 of these counties emerged as single-county work-oriented education subregions: Butler, Hamilton, Lucas, Wood, Franklin, Lorain, Medina, Wayne, Licking, Cuyahoga, Summit, Portage, Ashtabula, Trumbull, Mahoning, Columbiana, and Jefferson. The other 13 had to be combined with other counties in order to provide the benefits of a comprehensive program.

In addition to the criteria and the two statistics (high school enrollment and average tax base per enrollee) required by the application of the criteria, two other pieces of information went into the final regionalization. One was the array in terms of the six-variable index; the other was the "commutation matrix", constructed from data collected

by the 1960 Census of Population. A national sample of households was asked questions concerning the places of work of all employed family members. The commutation matrix, based on the result of this inquiry, is 88 counties square, and shows the place of residence and place of work of each employed person in 1960. In brief, the commutation matrix indicates the degrees of relationship which the inhabitants of one county will have with other counties nearby. We would expect that when persons from one county commute into another county to work, there would tend to be a commonality of traditions, points of view, economic needs, and the like which would tie them together. Therefore, in addition to the index rankings, commutation patterns also can help determine if a particular county belongs with one or another group of counties. The process of regionalization was undertaken in terms of the commutation matrix, the index values, the criteria, and their supporting statistical information.

## Procedure

In establishing these subregions, one could almost start anywhere and end up with about the same set of boundaries. For simplicity's sake, the beginning was made in the upper left-hand corner of the State by creating the smallest possible unit involving Williams and one or more counties. Williams County contained 2,349 high school enrollees in 1966-67 and had a supporting assessed valuation of $44,600 per enrollee. It could be combined with Defiance, Fulton, and/or Henry and still meet the criterion of contiguity. Williams was combined with Fulton for reasons which follow.

All four counties had tax bases more than adequate to meet the financial criterion, so that the total high school enrollment became the key criterion. As it turned out, only one combination (Williams and Fulton) had more than 5,000 students:

| | |
|---|---|
| Williams | 2,349 |
| Defiance | 2,572 |
| Fulton | 2,663 |
| Henry | 1,994 |
| Williams and Defiance | 4,921 |
| Williams and Fulton | 5,012 |
| Williams and Henry | 4,343 |

In terms of the 6-variable index, there was little difference between the similarity relationships of Williams/Fulton and Williams/Defiance. Moreover, there was no significant difference in the overall compactness of the two combinations. Thus, everything pointed to the Williams/Fulton combination and nothing pointed to another pairing. Similar reasoning, sometimes also involving reference to the commutation matrix, led to the delineation of the remaining districts or subregions.

## Results

The outlined procedure led to the creation of 45 districts or subregions which varied in inclusion from one to four counties. Only two subregions, both in the more mountainous areas bordering on the Ohio River, contained as many as four counties.

One of these includes Vinton, Jackson, Gallia, and Lawrence counties, while the other contains Guernsey, Belmont, Noble, and Monroe. There were 11 subregions containing three counties each, 15 subregions containing two counties each, and 17 single-county districts as mentioned above. These county combinations are listed in the Task Report.

It had been hoped that the objectively determined guides to the regionalization of Ohio would be so precise that a truly optimal set of boundaries could be established. If this had been true, any departures from the proposed units would have implied a departure from the "ideal" situation as measured by the statistics employed. Unfortunately, this is not the case. While the boundaries which have been established have much to recommend them, there are many instances where a particular county can be shifted to another district without serious departure from optimality.

However, it is important to note that, while there are certain changes in these groupings that might not involve a serious loss (or even any loss at all) of optimality, others could be quite detrimental. It is therefore suggested that any changes in the composition of the proposed subregions be made and evaluated in terms of the full set of guides.

## Additional Sets of Administrative Units

By changing the criteria – especially the one governing the total required high school enrollment – it becomes possible to vary the number of subregions that will be established. If, for example, the required high school population of a district is reduced to 2,500, the number of potential single-county districts will rise from 30 to more than 50. On the other hand, if this minimal requirement is raised to 10,000, the number drops to 12. Two additional sets of maps were constructed in this manner: the first providing a minimum of 10,000 high school enrollees per district, and the second providing a minimum of 20,000. The first divided Ohio into 29 subregions; the second, into 21 subregions.

Four sets of potential regions were established by a shift in method. Instead of applying the minimal-enrollment criterion, a deliberate attempt was made to divide the state into a specific number (nine, eight, five, and four) of essentially equal-sized regions.

These six proposed sets of administrative units are discussed briefly below.

### The 29-Unit Division

By raising the enrollment criterion from 5,000 to 10,000 and keeping all other criteria unchanged, we were able to construct a set of 29 administrative units. This set of 29 subregions contained one 6-county district and six of 5 counties. There were also four 4-county areas and six each of 3-, 2-, and 1-county composition.

### The 21-Unit Division

By using the enrollment criterion of 20,000 and only making combinations of whole districts from the first set, the total number of subregions was reduced to 21. This set

of administrative units is characterized by considerable variation in sizes. There are still five single-county districts (Hamilton, Lucas, Franklin, Cuyahoga, and Summit); and, there are two subregions – one in the central portion of the state and one in the southern portion, which embrace ten counties each.

## The Nine-Unit Division

In order to shift away from a map-division characterized by diversity of area to one of more nearly equal areas, the state has been divided into nine administrative districts. In principle, this consisted of a central district and eight peripheral districts. The largest (in terms of numbers of counties) embraces 12 counties and the smallest 7. In terms of high school enrollments, however, the range of difference is much greater. The smaller (Noble, and the six adjoining counties) contained 18,500 students in grades 9-12, while the largest ( in the northeast corner of the state) contained 189,700, or about ten times as many. Thus, the smallest subregion would be capable of supporting three or four minimum-standard regional training institutes; the largest could support about 40 of the same size or about ten of the maximum size.

In establishing this division, as well as the three others discussed below, the Ohio map was first divided on a tentative basis into the desired number and configurations of regions. Then the border counties of each preliminary region were examined in terms of the index of regionalization and final boundary adjustment made. In this way, each border county in the final subdivision was placed where it fitted best – always in terms of the variables included in the index.

## The Eight-Unit Division

In this instance, a deliberate attempt was made to achieve eight administrative units of eleven counties each. With the exception of the northeast corner of the State, this division tended to achieve a more nearly uniform distribution of high school enrollment than any of the above. But the northeastern region, with 215,800 enrollment, is over twice the size of the next largest region and over 10 times the size of the smallest.

## The Five-Unit Division

Below the eight-region level it becomes harder to justify further reduction in the number of districts, primarily because the regions themselves have become so large and sprawling. The five-region division is especially open to this criticism. After final adjustment of the border counties, the map is aesthetically and transportationally displeasing. There are several groups of counties which protrude as salients, especially in the central and northeastern areas. In this respect, the four-, eight-, and nine-region divisions seem more satisfactory.

## The Four-Unit Division

The last set of regions divides the state into quarters which would be of about equal areas if the southern boundary of the state were as nearly straight as northern. Each of these regions is so large, however, that anticipated administrative efficiency would be curtailed and costs would significantly rise.

## Conclusions

This exercise in regionalization has led to the creation of a spectrum of seven sets of proposed administrative units, all of which meet minimal criteria of high school enrollment and average assessed value (per high school student) of the tax base upon which the financing of work-oriented education would probably draw. Detailed maps were given in the Task Report.

There are a variety of reasons why very large administrative units, with districts or subregions reporting to a regional management unit, are probably more desirable than smaller administrative units. If for any reason a number of larger regions is the more attractive alternative, the nine-unit regions or the eight-unit regions seem most appropriate. There is some possibility – as pointed out above – that counties or even parts of certain school districts could be shifted to some extent without serious loss of optimality.

## RECOMMENDATIONS FOR IMPLEMENTATION OF OBJECTIVES

(1) Regional administrative units should be authorized by the State Legislature to provide the management and leadership of the proposed work-oriented educational system.

(a) The most appropriate division of the State into regional administrative units appears to be the 9-unit system or 8-unit system with districts underneath these units for more efficient operation.

(b) The regional administrative unit will be able to reduce regional educational costs through:

- Increased use of specialists such as psychologists, psychiatrists, and speech and hearing therapists
- More efficient business administration
- Improved personnel services to pupils
- Regionalized transportation facilities
- Centralized purchasing
- Regional data processing
- Coordinated library and instructional-media services
- Program planning on a regional basis for improved cost-effectiveness.

(c) The eight large cities in Ohio would be part of the larger regional administrative districts although immediate changes in structure would probably not be necessary. Within 3 years, shifts should occur which would enhance the

financial position of inner-city schools by tapping suburban sources for support under the regional administrative system.

(d) Alternative financing possibilities for the support of regional work-oriented education appear to fall into these categories or combinations of them: property taxes; regional, and/or county-based income tax; state foundation program; and Federal funds.

(e) Regional administrative units should be given the authorization by the Legislature to provide legal services to all districts in the region and to provide a professional community relations service to all districts in the region.

(2) An interdisciplinary curriculum commission should be established to develop State curriculum guidelines for each level of work-oriented education. This commission should recommend to the Ohio Department of Education a procedure to require, by the fall of 1971, each school receiving foundation funds to integrate the work-oriented education curriculum.

(a) At the vocational education level, grades 11-12, curriculum emphasis must be given to occupational fields instead of specific job skills.

(b) The concept of technical education, at the post-secondary level, must be a logical extension of secondary programs.

(c) Consideration might be given to the adoption of intensive 16-week vocational programs which prepare a person for a specific skilled or semiskilled job after the completion of a course of study in an occupational field or cluster during regular school attendance as a logical alternative to extensive programs in secondary schools which emphasize skilled training.

(3) Each student, when completing a work-oriented educational program, shall be placed by the guidance service in work related to his training.

(a) The implementation of this objective may place an unusual burden on the guidance service, but, in terms of student needs, it is quite important.

(4) At least one regional training institute should be established in each region which would serve the following functions:

(a) Area vocational school

(b) Technical education

(c) Residential center

(d) Training center for government and industry

(f) Regional pupil personnel services

(g) Research Center

(h) Coordinating functions for organizations like the Ohio Department of Health, Bureau of Vocational Rehabilitation, Division of Mental Hygiene and Corrections, etc.

(i) Regional administrative offices.

(5) Work-oriented education programs should operate on a year-round basis, although students would be required to attend only two out of three trimesters or three of four quarters.

(a) The adoption of 6-week summer terms is not recommended because of the cost-effectiveness of a limited program which could be made available.

(b) Larger salaries to teachers would result from year-round operation with increased satisfaction with teaching as a career.

(c) Guidance services could be improved, lowering the pupil-per-counselor ratio, by year-round operation.

(6) For those students now enrolled in general or academic programs who do not want to select programs in an occupational field for grades 11-12, intermediate orientation in appropriate occupational fields combined with nonoccupational work education should be required for graduation.

(7) All students, grades 9-10, should receive elementary orientation in occupational fields as a part of the work-oriented curriculum.

(8) The work-oriented educational curriculum should be adopted as part of the general curriculum.

(9) The trend to separate vocational high school from comprehensive high schools should be slowed. The artificiality of such arrangements creates an abnormal schism in the ranks of professional educators, contributes little to the improvement of the image of vocational education, and duplicates many functions of the districts lowering the efficiency of management administration.

(a) An alternative to separate vocational schools and low enrollment in small comprehensive schools is the regional administrative unit where one or two occupational clusters can be placed in each school.

(b) Work-oriented education must be integrated as part of the total educational system.

(10) The authorization and funding of programs should be supported by an analysis of manpower projections and the labor force. An index of potential employer needs also should be applied. Because of the difficulties in projecting specific manpower needs, training in occupational clusters or fields is strongly indicated.

(11) A commitment by the Ohio Department of Education should be made for the development of work-oriented education. This commitment would state that policy decisions will be made on the basis of valid and reliable research data.

## RECOMMENDATIONS FOR ADDITIONAL RESEARCH

(1) Research should be undertaken to specify instructional objectives in behavioral or operational terms for each area of the curriculum.

(2) Research should be undertaken to determine the disparity between employer hiring practices and employer policies.

(3) The adaptation of computerized classification system in which background data, abilities, aptitudes, knowledge, skills, and attitudes are matched with a detailed analysis of the requirements of various occupational clusters should be studied as a means of providing objective data in the establishment of realistic goals about education and work.

(4) Research should be conducted for the purpose of determining the type of data essential for a student to develop realistic goals.

(5) Research must be undertaken to determine if education in occupational fields actually increases the probability of employment and promotion on the job.

(6) A survey should be made to determine the attitudes of various segments of the Ohio population regarding the benefits of a total educational program which includes work-oriented education.

(7) Research should be undertaken to determine the educational needs of women, minority groups, and the disadvantaged.

(8) Research must be undertaken to determine the relevance of existing vocational and technical educational curricula.

(9) Staff career development in work-oriented education must be studied in order to improve the effectiveness of instruction and to increase satisfaction with teaching as a career.

(10) Further research must be conducted to identify and select objectives of components of work-oriented education and to study alternatives in the implementation of objectives.

(11) Planning studies for investigating programs and facilities for work-oriented education in regional administration units should be carried out.

(12) A methodology must be developed for program development and evaluation.

(13) Research must be conducted on work-oriented education and leisure time.

(14) Research must be conducted on the needs and resources for computer training in Ohio public and private schools.

(15) Research must be conducted to determine the type of cooperation among the various state and local agencies which would result in the most effective and efficient use of federal funds available to Ohio for the support of different components of work-oriented education.

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